Having thus described the preferred embodiments, the invention is now claimed to be:

1. A method of magnetic resonance imaging comprising:

(a) administering a magnetic resonance contrast agent to a subject which contrast agent alters T_1, T_2 and T_2^* magnetic resonance characteristics;

(b) exciting magnetic resonance in a region of interest of the subject which receives the contrast agent;

(c) applying a first echo planar readout waveform and generating first image data;

(d) applying a second echo planar readout waveform and generating T_2 or T_2^* weighted image data;

(e) reconstructing the image data to generate a first image representation and a T_2 or T_2^* weighted image representation; and

(f) correcting the T_2 or T_2^* weighted image representation with the first image representation.

2. The method as set forth in claim 1, further including:

applying an RF inversion pulse between the first and second echo planar readout waveforms.

3. The method as set forth in claim 1, further including:

applying a third echo planar readout waveform and generating the other of T_2 and T_2^* weighted image data.

4. The method as set forth in claim 3, further including:

applying an RF inversion pulse between the second and third echo planar readout waveforms, such that

the second echo planar readout waveform generates T_2^* weighted data and the third echo planar readout waveform generates T_2 weighted data.

5. The method as set forth in claim **4**, further including:

reconstructing the T_2 weighted data into a T_2 weighted image representation; and

modifying the T_2 weighted image representation with the first image representation.

6. The method as set forth in claim **1**, wherein the reconstructing step includes:

reconstructing the T_2 or T_2^* weighted image data and a portion of the first image data to generate the T_2 or T_2^* weighted image representation; and

reconstructing a portion of the T_2 or T_2^* weighted image data and the first image data to generate the first image representation.

7. The method as set forth in claim **6**, wherein the portion of the T_2 or T_2^* weighted readout waveform used to generate the first image representation and the portion of the first image data used to generate the T_2 or T_2^* weighted image representation include interleaved data lines adjacent an edge of k-space.

8. The method as set forth in claim **7**, further including:

generating additional data lines by conjugate symmetry.

9. The method as set forth in claim **1**, further including:

repeating steps (b)-(f) a plurality of times to generate a series of first image representations

and a series of T_2 or T_2^* weighted image representations; and

combining the series of first image representations and the series of T_2 or T_2^* weighted image representations to generate a third series depicting a temporal evolution of the contrast agent in the region of interest.

10. The method as set forth in claim **1**, further including:

(g) combining the first image representation and the T_2 or T_2^* weighted image representation to generate a third image representation; and

repeating steps (b)-(g) a plurality of times to generate a series of third image representations depicting a temporal evolution of the contrast agent in the region of interest.

11. The method as set forth in claim **1**, wherein the contrast agent includes a gadolinium chelate.

12. The method as set forth in claim **1**, wherein at least one of the steps of generating the first image data and generating the second image data includes generating image data using a partial parallel imaging technique.

13. A method of contrast enhanced magnetic resonance imaging in which a subject is injected with a contrast agent, magnetic resonance is excited in a region of interest, the excited magnetic resonance is permitted to decay for a preselected duration to optimize one of T_2 and T_2^* weighting, and after the preselected duration an echo planar sequence is applied to generate T_2 or T_2^* weighted data, the method further including:

during the preselected duration, applying another echo planar sequence to generate T_1 weighted data.

14. A method for imaging a patient using a magnetic resonance (MR) imaging apparatus, said MR apparatus including a patient support means, a main magnet, a slice-select gradient pulse generator, a phase-encode gradient pulse generator, a read gradient pulse generator, a plurality of RF coils, an RF transmitter, and a receiver, the method comprising:

administering a contrast agent to the patient;

exciting a magnetic resonance in the patient using the RF transmitter and at least one of the plurality of RF coils in conjunction with the slice-select gradient generator;

encoding and reading the magnetic resonance using the phase encode and the read gradient generators in conjunction with at least one of the plurality of RF coils and the receiver, the encoding and reading implementing a first echo-planar readout waveform;

encoding and reading the magnetic resonance using the phase encode and the read gradient generators in conjunction with at least one of the plurality of RF coils and the receiver, the encoding and reading implementing a second echo-planar readout waveform; and

reconstructing the encoded and read magnetic resonance into first and second image representations.

15. The imaging method according to claim **14**, further comprising:

comparing the first image representation with the second image representation to obtain a third image representation thereby.

16. The imaging method according to claim **15**, further comprising:

repeating the steps of exciting a magnetic resonance, encoding, reading, and reconstructing first and second images, and comparing the first images with the second images to obtain third images thereby; and

determining a temporal evolution of at least one of the first image, the second image, and the third image.

17. The imaging method according to claim **14**, wherein:

in the step of reconstructing the second image, a portion of the encoded and read resonance from the first echo planar readout waveform is reconstructed into the second image.

18. The imaging method according to claim **14**, wherein:

the first echo planar readout waveform phase encoding includes,

phase encoding a first portion of the resonance such that a k_y component single-steps in a first direction, and

phase encoding a second portion of the resonance such that the k_y component double-steps in the first direction;

the second echo planar readout waveform phase encoding includes,

phase encoding a first portion of the resonance such that the k_y component double-steps opposite to the first direction, and

phase encoding a second portion of the resonance such that the k_y component single-steps opposite to the first direction; and

the reconstructing step includes,

reconstructing the first and second portions of the first echo planar readout waveform and the first portion of the second echo planar readout waveform into the first image representation, and

reconstructing the second portion of the first echo planar readout waveform and the first and second portions of the second echo planar readout waveform into the second image representation.

19. A magnetic resonance imaging apparatus comprising:

a main magnet which generates a temporally constant magnetic field through an examination region;

an RF system which excites and manipulates magnetic resonance in the examination region and which receives and demodulates magnetic resonance signals from the examination region into data lines;

a sorter which sorts the data lines between a first data memory and a second data memory;

a gradient magnetic field system which generates magnetic field gradients across the examination region to spatially encode the resonance signals;

a sequence controller which,

(i) controls the RF system to induce resonance;

(ii) controls the RF and gradient systems to implement a first echo planar readout waveform which generates T_1 weighted data lines;

(iii) controls the RF and gradient systems to implement a second echo planar

readout waveform which generates one of T_2 and T_2^* weighted data lines, and

(iv) controls the sorter to sort the T_1 and T_2 or T_2^* weighted data lines between the first and second data memories; and

a reconstruction processor which reconstructs data lines from the first data memory into a first image representation and data lines from the second data memory into a second image representation.

20. The magnetic resonance apparatus as set forth in claim **19** further including:

a means for injecting a contrast agent into a subject in the examination region; and

an image processor for combining the first and second image representations into a contrast agent enhanced image representation.

21. The magnetic resonance apparatus as set forth in claim **20** wherein:

the sequence controller controls the sorter to sort

(i) all of the T_1 weighted data lines and a portion of the T_2 or T_2^* weighted data lines into the first image memory and

(ii) all of the T_2 or T_2^* weighted data lines and a portion of the T_1 weighted data lines into the second image memory.

22. The magnetic resonance apparatus as set forth in claim **19** wherein the RF system further includes:

a phased array receive coil; and

a partial parallel imaging (PPI) integrator which processes the readout of the phased array receive coil to generate data lines.

23. The magnetic resonance apparatus as set forth in claim **22** wherein the partial parallel imaging (PPI) integrator processes the readout of the phased array receive coil using one of a simultaneous acquisition of spatial harmonics (SMASH) technique, a sensitivity encoding (SENSE) technique, and a parallel imaging with localized sensitivities (PILS) technique.